

Success in the Field - Crime Mapping and S.A.R.A. in the Buenos Aires Province of Argentina

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Example: San Martin Regional Police Headquarters

"...After all, facts are facts, and although we may quote one to another with a chuckle the words of the Wise Statesman, 'Lies--damned lies--and statistics,' still there are some easy figures the simplest must understand, and the astutest cannot wriggle out of."

Leonard Henry Courtney, 'To My Fellow-Disciples at Saratoga Springs,' *The National Review* [London] **26** (1895) 21-26 at page 25.



Argentinean Republic

Area: 3,761,274 Km²
Population: 36,223,947



Buenos Aires Province

Area: 307,571 Km²
Population: 13,818,677

Apologies

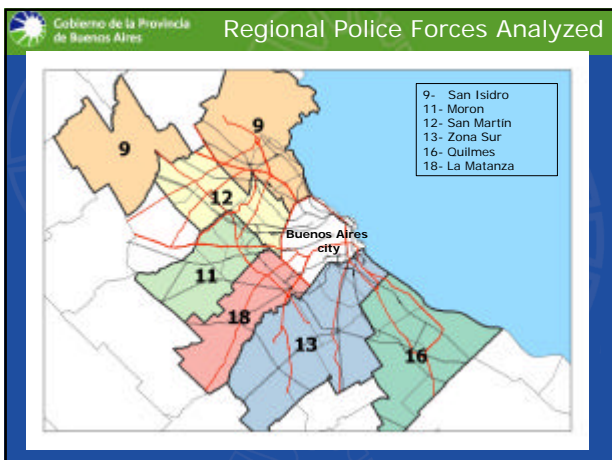
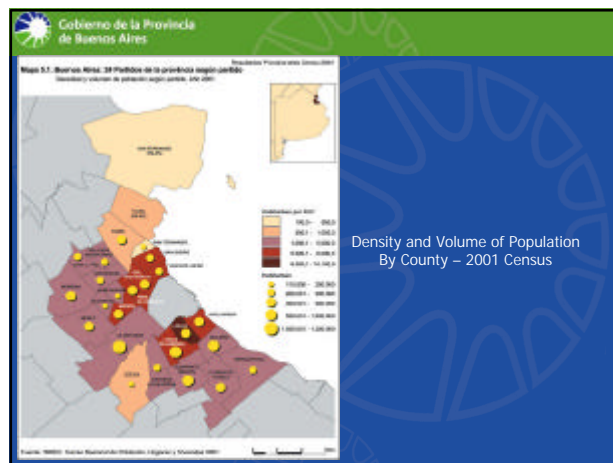
- For the Grammar & Spelling mistakes
– (our native tongue is SPANISH)

Study Area



Gobierno de la Provincia de Buenos Aires Basic Data						
	Population	Area [km ²]	Density [Hab / km ²]	Police Beats ¹¹	Police Officers	Police Officers by Beats / 1000 inhab.
República Argentina ²¹	36,223,947	2,791,810	13	NO DATA	NO DATA	NO DATA
Ciudad Autónoma de Buenos Aires ²¹	2,768,772	200	13,844	53	10,200	3.7
Provincia de Buenos Aires	13,818,677	307,571	45	335	19,107	1.4
Conurbano Bonaerense ¹¹	8,684,953	3,630	2,393	168	9,780	1.1
Resto de la Provincia ¹¹	5,133,724	303,941	17	167	9,327	1.8

¹¹ Only Police Beats, not decentralized Units.
²¹ The area of the "República Argentina" (emerged lands) is 3,761,274 km², 2,791,810 km² of them are on South America, y 9,464 km² are on the Antártica, including the "Islas Orcas del Sur", "Georgias del Sur" and "Sandwich del Sur".
²² Capital de la República Argentina.
²³ INDEC's definition includes only 24 counties, and not the "expanded" definition with 29 partidos.
²⁴ The remaining 110 counties (there are 134 counties in Buenos Aires Province).

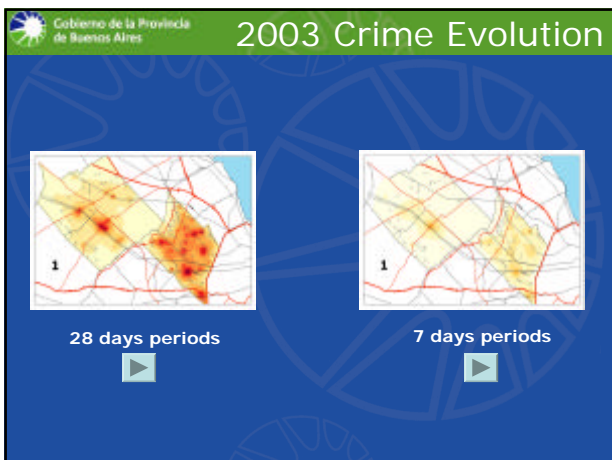
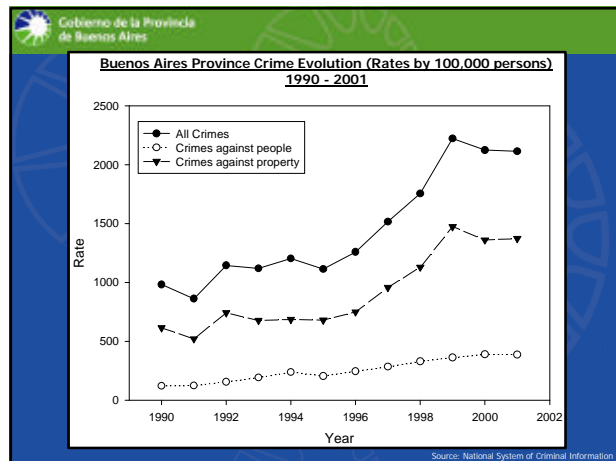
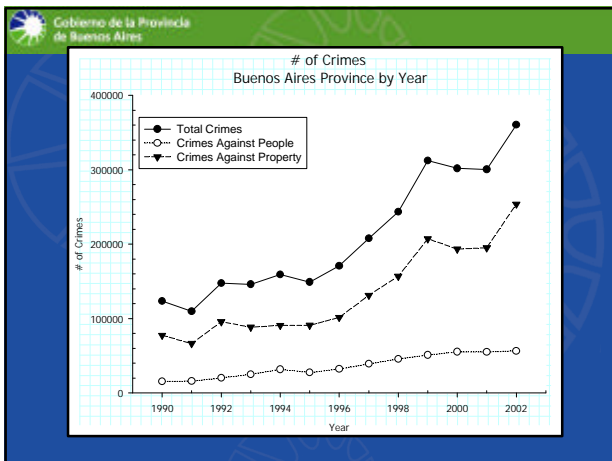


Gobierno de la Provincia de Buenos Aires Basic Data			
County	People	Surface [km ²]	Density [Inhab / km ²]
San Isidro	291,505	48	6,073.0
San Fernando	151,131	924	163.6
Tigre	301,223	360	836.7
Vicente López	274,082	39	7,027.7
9 – San Isidro Police Force	1,017,941	1,371	742.5
Hurlingham	172,245	36	4,784.6
Ituzaingó	158,121	39	4,054.4
Merlo	469,985	170	2,764.6
Moreno	309,380	56	5,524.6
11 – Morón Police Force	1,109,731	301	3,686.6
José C. Paz	230,208	50	4,604.2
Malvinas Argentinas	290,691	63	4,614.1
General San Martín	403,107	56	7,198.3
San Miguel	253,086	80	3,163.6
Tres de Febrero	336,467	46	7,314.5
12 – San Martín Police Force	1,513,559	295	5,130.7

Gobierno de la Provincia de Buenos Aires Basic Data			
County	People	Surface [km ²]	Density [Inhab / km ²]
Almirante Brown	515,556	122	4,225.9
Avellaneda	328,980	55	5,981.5
Esteban Echeverría	243,974	120	2,033.1
Ezeiza	118,807	223	532.8
Lanus	453,082	45	10,068.5
Lomas de Zamora	591,345	89	6,644.3
13 – Lomas de Zamora Police Force	2,251,744	654	3,443.0
Berazategui	287,913	198	1,531.5
Florencio Varela	348,970	190	1,836.7
Quilmes	518,788	125	4,150.3
11 – Quilmes Police Force	1,155,671	503	2,297.6
La Matanza	1,255,288	323	3,886.3
12 – La Matanza Police Force	1,255,288	323	3,886.3

Source: 2001 Census

- Gobierno de la Provincia de Buenos Aires Context
- Increase in crime rates over the last decade, (+100 %)
 - Increase in urban violence,
 - 2002-2003 'crime rage' with community uproar events.



Gobierno de la Provincia de Buenos Aires

S.A.R.A.

Gobierno de la Provincia de Buenos Aires

What is S.A.R.A?

- Methodical process for problem solving
- Four Stages / Phases:
 - **Scanning:** spotting problems using knowledge, basic data and electronic maps.
 - **Analysis:** using hunches and information technology to dig deeper into problems' characteristics and underlying causes.
 - **Response:** devising a solution, working with the community, wherever possible.
 - **Assessment:** looking back to see if the solution worked and what lessons can be learned.

www.crimereduction.gov.uk

Gobierno de la Provincia de Buenos Aires

How to strengthen the "A"s

- Training:
 - Crime Analysis Institute:
 - Tertiary Degree on Criminal Analysis (2 years program)
 - 2003 first promotion of Analysts (24 analysts).
- Analysis Units with Professional & Concerned Analysts:
 - Ce.P.A.I.D:
 - Management and Analysis Centers of Crime Data – 10 Functional Units (out of 18 planned)
 - Enterprise GIS & Central Analysis Office
 - Analysis & Assessment Protocols

Cooperation Policy

Cooperation Policy

- Implemented during late 2003
- Involved concerted efforts of the Buenos Aires Province Police Force and the Federal Forces:
 - Gendarmerie
 - Federal Police Force
 - Coast Guard
- No particular areas were pre-designated for attention.
 - Crime Analysis / Mapping was heavily used to dynamically relocate and focus the efforts.

Cooperation Policy

- After the initial identification of crime patterns, in depth analysis was undertaken to determine the causes, and better adjust the response.
- The focus of the policy is crime PREVENTION rather than mere repression.
- COOPERATION is a key element, not only among Law Enforcement Agencies but also with the community, building partnerships.
- The Crime Analysts are CENTRAL elements to this policy since they have become the local "crime experts".

Cooperation Policy

- Several police strategies were deployed, and multiple police groups were employed depending on the type of Crime Problem.
- Techniques of Situational Crime Prevention: [*]
 - Increase the effort,
 - Increase the risk,
 - Reduce the rewards,
 - Reduce Provocations,
 - Remove Excuses.

[*] Become a Problem Solving Crime Analyst – Clark, Ronald V., John Eck, Jill Dando Institute of Crime Sciences.

Cooperation Policy

- In order to Assess the policy, different procedures were implemented:
 - Satisfaction surveys,
 - Crime level studies,
 - Displacement studies.
- This presentation will briefly show the results of the displacement studies, following the lines of:
 - Bailey, Trevor C.; Anthony C. Gatrell (1995). Interactive Spatial Data Analysis. Longman Group Ltd.
 - Ratcliffe, Jerry (2002). Burglary Reduction and the myth of Displacement. Australian Institute of Criminology.

Basic Definitions

- Crimes Analyzed: = "Preventable" crimes [*]
 - Robberies
 - Burglaries
 - Thefts
 - Auto-Thefts, etc.
- Starting Point : = First Day of the "Cooperation Policy"
- Periods Analyzed = 28 days each (4 weeks)
 - 3 prior periods,
 - 3 posterior periods,

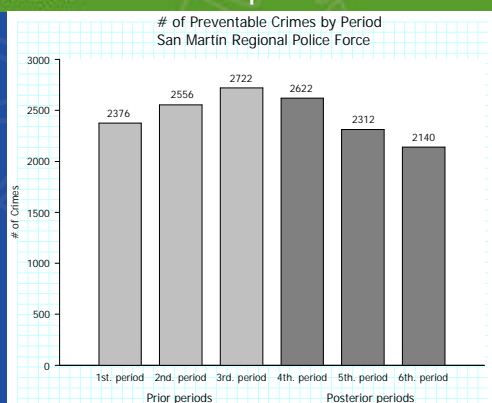
[*] Each crime type was also analyzed independently, yet we do not have time to show each one here, so we will show a group of crime types.

- Development of appropriate software for testing the independence of point patterns:
 - Consider k point processes,
 - Take a random sample of n points within the study area (\mathfrak{A}),
 - Measure the **nearest neighbor** point-event distances ($d_i, i=1, \dots, k$)
 - Use Spearman's rank correlation coefficient to test for independence.
 - Consider using an edge correction, being usual to discard from the sample any distances where random points are nearer to the boundary of \mathfrak{A} than to a neighboring event of any type.
 - Employ m Monte Carlo-type simulations

- Spatial Displacement of Point Processes
- Required data:
 - X, Y coordinates of the events in each process with identification of the process,
 - X, Y coordinates of the border of the study area (polygon to point).
- Output:
 - m groups of n random points within the study area, each point is linked to k **nearest neighbor** point-event distances.
 - m Spearman's ρ matrix ($k \times k$) with significance levels.
 - Mean Spearman's ρ matrix ($k \times k$).
 - Std. Dev of Spearman's ρ matrix ($k \times k$).



- San Martin Regional Police Force Example:
 - Six periods analyzed $\rightarrow k = 6$,
 - 100 random points per simulation $\rightarrow n = 100$,
 - 500 Monte Carlo simulations.



Spearman Correlation Matrix (mean of 500 realizations (Monte Carlo), standard deviation in parenthesis)*						
	1st period	2nd period	3rd period	4th period	5th period	6th period
1st period	1 (n/a)	0.568 (0.074)	0.557 (0.079)	0.559 (0.080)	0.570 (0.080)	0.544 (0.071)
2nd period		1 (n/a)	0.570 (0.071)	0.566 (0.073)	0.554 (0.083)	0.555 (0.077)
3rd period			1 (n/a)	0.571 (0.081)	0.551 (0.089)	0.568 (0.074)
4th period				1 (n/a)	0.552 (0.086)	0.572 (0.082)
5th period					1 (n/a)	0.562 (0.088)
6th period						1 (n/a)

*All the correlations are significant at least at the 0.001 level

Displacement Study

The results show that all the periods are positively correlated and statistically significant on every realization. Hence this suggest the "Cooperation Policy" was successful in reducing crimes & there doesn't seem to be a significant spatial displacement of crime.

The overall pattern of crime has remained focused in certain hot-spot zones, yet the intensity has decreased over the studied period.

Conclusions

- So far and after more than 6 month of continuous application of the Cooperation Policy coupled with a new Police Directive, crime levels are steadily and consistently going down in the entire Conurbano Area,
- The General Public is slowly acknowledging the benefits of this "new way of doing business",
- Crime Analysis has become a key element of Law Enforcement Crime Prevention,
- For the first time, the agency is able to report, not only success, but also how it had been measured.

Thanks for your time,

Preguntas?